

Proposed amendments to the Security of supply forecasting and information policy

Consultation paper

Submissions close: 5:00pm, 22 November 2022



Executive summary

The security of supply forecasting and information policy (SOSFIP) is a document prepared by the system operator and incorporated by reference into the Electricity Industry Participation Code 2010 (Code) by the Electricity Authority (Authority) in accordance with section 64 of the Legislation Act 2019.

The SOSFIP sets out the range of security of supply information the system operator must determine and publish to assist the industry to manage generation fuel and generation supply over the short, medium and long term. This includes determining the electricity risk curves, and the electricity risk status meter. It does not relate to the actions participants must take in response to this information, or management of short-term power system conditions. Those are managed through the emergency management policy (EMP), the policy statement, and the system operator's "business as usual" obligations under the Code.

In the first half of 2021, sustained low hydro inflows coupled with a 20% reduction in gas production resulted in a period of elevated wholesale electricity prices. There was a high level of industry and media commentary at the time and concern expressed that the Electricity Risk Curves (ERCs) were not accurately estimating the availability of gas for thermal generation. As part of the response to this concern, the Authority commissioned MartinJenkins to undertake an operational review of the 2021 dry year event.

Following the recommendations made by MartinJenkins and the Authority, the system operator reviewed the settings of the SOSFIP and the EMP. As required by the Code, the system operator published a consultation paper on 29 March 2022 proposing several changes be made to the SOSFIP and EMP. Submissions closed on the consultation paper on 26 April 2022 and the system operator has considered the submissions received.

After consideration of submissions, the system operator submitted a draft SOSFIP and EMP to the Authority. The Authority approved the changes to the EMP¹ but has declined to approve the draft SOSFIP as it was submitted.

When declining the draft SOSFIP, the Code requires the Authority to publish the changes it wishes the system operator to make to the draft SOSFIP and to consult on those changes.²

The Authority wants changes to two sections of the SOSFIP:

- In the 'confidential information' section, for clarity and administrative efficiency, there should be explicit provision for the Authority to see confidential information for the purposes of monitoring the system operator and assuring itself and industry that the assumptions underpinning the ERCs are accurate. This is currently implicit and if the system operator wants formal notification, requires the Authority to issue a direction under Section 46 of the Electricity Industry Act.

By explicitly including this provision in the SOSFIP, along with an obligation on the Authority to maintain the confidentiality of the information, it is clear to participants and the system operator that the system operator is permitted to pass this information onto the Authority.

¹ See the decision paper published on our website [System operator documents incorporated into the Code by reference — Electricity Authority \(ea.govt.nz\)](#)

² Clauses 7.5(5) to 7.5(10)

- In the 'determining the ERCs' section the Authority wants the assessment of electricity demand response to be based on the system operator's judgement of the demand response that will be likely, based in its judgement and experience of how demand and the market responds to price and power system security signals. This can include formal demand response contracts, historical observation, and information the system operator is aware of, but also includes modelling, forecast future demand response and any other demand response likely in the system operator's judgement. For electricity demand response, the Authority also wants any thresholds removed.

The system operator has many years of experience managing the power system and how demand reacts, in aggregate, to risk and price. Increasing demand response has been identified as a critical part of the strategy to transition to 100% renewables. There is significant investment being made into development of real time pricing (RTP) and the Authority sees the RTP project as a key enabler encouraging an increasing amount of demand response. The Authority is also reviewing the distribution sector settings with a focus to increasing the amount of distributed energy resources on the distribution networks. This includes distributed generation, energy storage systems and demand reduction, both as individual consumers and aggregated market offerings.

Not including the system operator's assessment of demand response in the risk curves will have the effect of lifting the risk curves higher than they should be. This will be seen by the market as a higher risk of hydro storage shortage. This will inevitably lead to higher wholesale prices as generators seek to conserve water earlier than they would if the risk curves were lower.

Higher wholesale prices will translate into higher prices for consumers, prices that are not justified by the actual risk.

The Authority agrees with the other changes proposed by the system operator in the draft SOSFIP as submitted.

Contents

Executive summary	ii
1 What you need to know to make a submission	5
What this consultation paper is about	5
How to make a submission	5
When to make a submission	5
2 The system operator has proposed amendments to the SOSFIP	6
The SOSFIP is prepared by the system operator	6
The system operator has submitted a draft SOSFIP following a review	6
Most of the proposed changes are supported but two are not	7
3 Assessing electricity demand response	7
4 Sharing assessment information with the Authority	9
Appendix A Format for submissions	10
Appendix B Draft SOSFIP as submitted by the system operator	11
Appendix C Authority's proposed amendments to the SOSFIP	12
Glossary of abbreviations and terms	25

What you need to know to make a submission

What this consultation paper is about

- 1.1 The purpose of this paper is to seek comments on changes the Authority wishes the system operator to make to the draft SOSFIP, from participants, the system operator, and interested parties.
- 1.2 The Authority's proposed changes to the SOSFIP are set out in Appendix C.

How to make a submission

- 1.3 The Authority's preference is to receive submissions in electronic format (Microsoft Word) in the format shown in Appendix A. Submissions in electronic form should be emailed to policyconsult@ea.govt.nz with "Consultation Paper—Authority's changes to the SOSFIP" in the subject line.
- 1.4 Clause 7.5(8) of the Code requires that the Authority provide all submissions to the system operator and publicise them on the Authority's website.
- 1.5 If you consider that the Authority should not publish any part of your submission, please:
 - (a) indicate which part should not be published;
 - (b) explain why you consider that part should not be published; and
 - (c) provide a version of your submission that can be published (if the Authority agrees not to publish your full submission).
- 1.6 If you indicate there is part of your submission that should not be published, staff will discuss with you before deciding whether to not publish that part of your submission.
- 1.7 However, please note that all submissions we receive, including any parts that are not published, can be requested under the Official Information Act 1982. This means the Authority would be required to release material that it did not publish unless good reason existed under the Official Information Act to withhold it. The Authority would normally consult with you before releasing any material that you said should not be published.

When to make a submission

- 1.8 Please deliver your submissions by **5pm** on Tuesday **22 November 2022**
- 1.9 The Authority will acknowledge receipt of all submissions electronically. Please contact info@ea.govt.nz if you do not receive electronic acknowledgement of your submission within two business days.

The system operator has proposed amendments to the SOSFIP

The SOSFIP is prepared by the system operator

- 2.1 The SOSFIP plays a key role in the set of Code provisions, contracts and other arrangements that collectively deliver common quality, power system stability and security, and orderly system operation.
- 2.2 The SOSFIP is a document prepared by the system operator and incorporated by reference into the Code by the Authority in accordance with section 64 of the Legislation Act 2019 and clause 7.4 of the Code.
- 2.3 The SOSFIP must include requirements that the system operator—
 - (a) prepare and publish at least annually a security of supply assessment that contains detailed supply and demand forecasts for at least 5 years, which assists interested parties to assess whether the security of supply standards are likely to be met
 - (b) consult with persons that the system operator thinks are representative of the interests of persons likely to be substantially affected by a security of supply assessment before publishing such an assessment
 - (c) prepare and publish information that assists interested parties to monitor how hydro and thermal generating capacity, transmission assets, primary fuel, and ancillary services are being utilised to manage risks of shortage, including extended dry periods
 - (d) publish sufficient details of the modelling data, assumptions, and methodologies that the system operator has used to prepare the above information as to allow interested parties to recreate that information (but without publishing information that is confidential to any participant).
- 2.4 The current SOSFIP came into effect on 1 November 2018.

The system operator has submitted a draft SOSFIP following a review

- 2.5 The system operator provided a draft SOSFIP to the Authority on 23 August 2022. This resulted from the recommendations made by the Authority and the MartinJenkins report into the 2021 dry year event. The system operator consulted with interested parties, in accordance with clause 7.5(3) of the Code.
- 2.6 The system operator proposed updates to the SOSFIP to reduce uncertainty and subjectivity, in particular:
 - (a) potential updates in assumptions around gas reallocation used to inform the ERCs to better reflect prevailing conditions in the gas and electricity market (three options were included in the consultation)
 - (b) reviewing the assumptions used to determine electricity demand response in the ERCs
 - (c) clarifying that medium demand forecast be used in determining the ERCs

- (d) simplifying reporting by removing the current watch and alert curves but retaining the percentage risk curves
 - (e) encouraging proactive information disclosure to the system operator.
- 2.7 The system operator also took the opportunity to propose a number of relatively minor changes to remove duplication and aid clarity.
- 2.8 The draft SOSFIP as submitted (with changes tracked) is attached as Appendix B

Most of the proposed changes are supported but two are not

- 2.9 Most of the changes proposed to the SOSFIP align with the Authority's and MartinJenkins' recommendations, however there are two areas that do not.
- (a) The Authority regards the system operator as the experts in assessing how demand reacts to price and other power system requirements, so would like the system operator to apply their judgement to the assessment of electricity demand response (ie distributed energy resources (DER) or industrial demand reduction) when calculating the electricity risk curves. The system operator proposes demand response only be included if it is likely to respond in the short-term or there is a known contract for the DER. The Authority believes this approach will underestimate the amount of demand response available leading to higher electricity risk curves and increased cost for consumers.
 - (b) The SOSFIP should explicitly state that information that is given to the system operator to support the electricity risk curves assumptions will be made available to the Authority. This is so the Authority can assure itself and the industry that the risk curves are based on valid assumptions. The inability to do this in 2021 directly led to industry uncertainty, reduced confidence, and the letters (issued under section 46 of the Act) to Transpower and participants formally requiring that information. The current confidentiality provision requires the Authority to change the Code or to continue to issue requests under section 46 of the Act to access this information.

Assessing electricity demand response

- 3.1 The Authority agrees with the system operator's draft changes for the assessment of gas fuel re-allocation for generation, an approach of only including gas fuelled generation if it is likely to respond in the short-term ("type 1") or there is a known contract ("type 2") for the reallocation of gas. This is appropriate as the system operator is not an expert in the gas upstream supply or industrial use and reallocation markets. Therefore, it is reasonable the system operator only includes gas generation that is certain to respond.
- 3.2 The system operator has proposed using the same methodology for assessing electricity demand response. Demand response, in this context, includes reduction in demand or increase in distributed generation (directly and/or from energy storage) in response to market signals. However, the Authority believes this approach is not reasonable for assessing electricity demand response and will underestimate the amount of demand response available, leading to higher electricity risk curves and inevitably lead to increased cost for consumers.
- 3.3 The Authority views demand response as a critical piece of the supply demand balance and will become more important as DER becomes more widespread. Increasing demand response has been identified as a critical part of the strategy to transition to 100%

renewables. The Authority is undertaking significant market changes in introducing 'real time pricing' and in reviewing the distribution sector settings. Integral to both of these projects is the framework to incentivise significantly more DER, both by consumers individually and through encouraging aggregation.

- 3.4 One of the system operator's core areas of expertise is in the management of the supply and demand of electricity across the grid. This is one area where the experience and judgment of the system operator can be used for the security of supply assessment and will be of benefit to participants and consumers. The system operator's expertise and judgement will become even more important in future with electrification of industrial load and potential new large loads.
- 3.5 The system operator has many years of experience managing the power system and how demand reacts, in aggregate (at grid exit point level), to risk and price. As the amount and type of demand response, especially DER, increases the system operator will continue to gain valuable experience in how the power system responds.
- 3.6 Although formal agreements for demand response will give certainty, it is likely there will remain a significant amount of demand response that will not formally contract (for example, business that respond directly to price, solar households that do not contract with an aggregator, etc), or those contracts are not announced (for example, because they are part of a total energy management package sold to consumers).
- 3.7 As the demand response market develops (formal or informal) some industrials will take the opportunity to monetise their demand response, and so contracts may emerge giving some of the characteristics of the "type 2" proposal. However, until that happens, and for the section of the market that does not formalise their demand response, the security of supply process will benefit from the system operator's experience and judgement.
- 3.8 The category of demand response also includes distributed generation. As the amount of distributed generation increases, both as direct generation and battery discharge (electric vehicle to grid, or batteries paired with solar panels), distributed generation will become more influential in reducing peak demand. Some distributed generation may be subject to aggregation and formal contracts, but much will not. The system operator, with its central view of the entire power system, will see the aggregated effects of distributed generation at grid exit point level and be able to use their experience and judgement to include it appropriately in the ERC assumptions
- 3.9 Additionally, the costs and administration associated with a comprehensive disclosure regime needed for the electricity sector (as opposed to the few participants in the gas fuel sector) would be likely to exceed any benefit, even assuming such a regime is more beneficial than the system operator's extensive experience and judgement.
- 3.10 By not using experience and judgement to include demand response appropriately in the ERC assumptions, the system operator is likely to underestimate the actual amount of demand response. Within the modelling used in the ERCs, this will result in the percentage risk curves being set higher than they otherwise would be, giving the market indication that the risk of hydro storage shortage is higher than it actually is. As actual hydro storage reduces as part of the natural cycle, it will approach the risk curves sooner, and the industry will react by increasing hydro generation price to conserve water for the expected winter demand. Higher wholesale prices will inevitably translate into higher retail prices for consumers.

- 3.11 For these reasons, the Authority prefers to retain the status quo used for electricity demand response, where the system operator uses its experience and judgement (which will include any known contracts) to assess the amount of demand response available. The system operator will have the ability to adjust that assessment as its experience of the higher volume of demand response, including DER, solidifies in the coming years.
- 3.12 The amendments proposed by the Authority are included in tracked change format in Appendix C. To make it easy for submitters to identify the changes wanted by the Authority, all changes proposed by the system operator have been accepted, and the Authority's changes have been inserted in track change format.

Q1. Do you agree with the Authority's proposal that the system operator should use its experience and judgement to assess electricity demand response? If not, please state why?

Sharing assessment information with the Authority

- 4.1 The system operator provides the system operator service to the industry under the provisions of the Code, and under contract to the Authority. However, the Authority also has a role to play.
- 4.2 That role includes monitoring the system operator's performance, and to assure the industry and other stakeholders that the assumptions underpinning the ERCs are reasonable, and therefore the ERC's themselves are a reasonable assessment of risk. This becomes even more important when there is conflicting information in the public domain and media, especially when that information appears to indicate the actual risk is higher and therefore the costs to consumers rises.
- 4.3 To perform that role, the Authority needs access to the same information as the system operator. The inability to do this in 2021 directly led to industry uncertainty and reduced confidence. The Authority's response was to formally require that information under the provisions of section 46 of the Act. This permitted a situation to escalate over several weeks when the Authority could have resolved it simply and quickly if it had access necessary information.
- 4.4 By explicitly including this provision in the SOSFIP, it is clear to participants and the system operator, that the system operator can pass information onto the Authority. This is so the Authority can assure itself and the industry that the risk curves are based on valid assumptions.
- 4.5 The information will remain confidential – confidential to both the system operator and the Authority staff needed to perform the monitoring and assurance role. The Authority does not intend to release confidential information.

Q2. Do you agree the system operator should be able to pass information onto the Authority for the purpose of monitoring and assuring stakeholders the ERCs are reasonable? If not, why?

Appendix A Format for submissions

Submitter	
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Question	Comment
Q1. Do you agree with the Authority's proposal that the system operator should use its experience and judgement to assess electricity demand response? If not, please state why?	
Q2. Do you agree the system operator should be able to pass information onto the Authority for the purpose of monitoring and assuring stakeholders the ERCs are reasonable? If not, why?	

Appendix B Draft SOSFIP as submitted by the system operator

Security of Supply Forecasting and Information Policy

Effective Date: ~~15 December 2020~~

1. Background

1.1 This Policy sets out the **system operator's** policy on information and forecasting for New Zealand and South Island security of supply. Security of supply in the context of this Policy is the New Zealand power system's present and future ability to meet electricity demand at a ~~national and~~ South Island ~~level and national level~~.

1.2 The **system operator's** principal objective under this Policy is to ensure, to the extent possible, the provision of ~~high quality~~high-quality security of supply related information to all interested parties.

~~1.3 Other parts of the Code contain details about how the system operator will respond to emergencies and other security of supply situations. These include the emergency management policy, the policy statement, Part 9 of the Code, the system operator rolling outage plan and the clauses of the Code relating to grid emergencies.~~

1.3 Part 7 of the Code sets out the system operator's obligation to prepare and publish the security of supply forecasting and information policy and the emergency management policy. Part 9 of the Code sets out the system operator's obligation to prepare and publish the system operator rolling outage plan and the system operator may request specified participants to develop a participant rolling outage plan. Part 9 also sets out the circumstances when the system operator must commence an official conservation campaign. Together, these policies and obligations relate to managing an extended emergency in which the ability of the power system to meet demand over an extended period of time is at risk.

2. Glossary

2.1 In this Policy, unless the context otherwise requires—

alert status curve means ~~the 4% electricity risk curve~~

available hydro storage means hydro storage, including **contingent hydro storage** whether currently available or not, that, in the **system operator's** reasonable opinion, is controllable and available for generation of electricity from—

- (a) Lakes Tekapo, Pukaki, Te Anau, Hawea and Manapouri for the South Island; and
- (b) Lakes Taupo, Tekapo, Pukaki, Te Anau, Hawea and Manapouri for New Zealand; and
- (c) any other lakes the **system operator** decides to include under clause 5.1A of this Policy

Code means the Electricity Industry Participation Code 2010

contingent hydro storage means the additional hydro storage that becomes available for generation at a **contingent storage release boundary**

contingent storage release boundary means an **electricity risk curve** representing a level of risk of future shortage at which a resource consent grants the consent holder access to additional hydro storage

contingent storage release information means information about the **contingent hydro storage** currently available for generation

electricity risk curve means the New Zealand or South Island hydro storage level over a calendar year that represents a specific, quantified level of risk of future shortage determined by factoring in all **available hydro storage**, which may include a floor under clause 6.1A

electricity risk curve disclosure information, in relation to a participant, means information that –

- (a) is about the **participant**; and
- (b) is held by the **participant**; and
- (c) the **participant** expects, or ought reasonably to expect, will, or is likely to have a material impact on the **electricity risk curve** inputs and assumptions made publicly available by the **system operator**

electricity risk meter status curves means the **watch status curve** and the **alert status curve**

extended emergency has the meaning given to it in the **emergency management policy**

formal agreement means a binding agreement that enables a response such as:

- (a) increased electricity generation due to a reallocation of gas; or
- (b) electricity demand to be reduced.

The following information related to the response should be included in the agreement:

- (a) maximum quantity of increased electricity generation and/or electricity demand reduction (TJ per day or MWh per day);
- (b) duration of the response (days);
- (c) under what conditions the response could be activated, including any options for parties to activate the response; and
- (d) how the response is linked to an **official conservation campaign**.

Where there is any doubt as to whether an agreement is a **formal agreement** for the purposes of this policy, the **system operator** shall have the final determination

inflows mean the hydrological inflows into—

- (a) Lakes Tekapo, Pukaki, Te Anau, Hawea and Manapouri for the South Island; and
- (b) Lakes Taupo, Tekapo, Pukaki, Te Anau, Hawea and Manapouri for New Zealand; and
- (c) any other lakes the system operator decides to include under clause 5.1A of this Policy

~~rate of decline methodology~~ is the methodology developed by the ~~system operator~~ under clause 7A.4

SOSA means the Annual Security of Supply Assessment referred to in clause 7.3(1)(a)(i) of the **Code**.

thermal fuel validation methodology means the process followed by the **system operator** to evaluate restrictions on thermal fuel availability, as it relates to the **electricity risk curve** inputs and assumptions made publicly available by the **system operator**

type 1 response means a **participant** market response, resulting in increased electricity generation (due to reallocation of gas from industrial users) or reduced electricity demand that can occur within 4 weeks which:

(a) the system operator has been made aware of; or

~~(a)~~(b) has been identified through historical observation(s),

and in each case the **system operator** reasonably believes is still applicable.

Where there is any doubt as to whether a response is a **Type 1 response** or the impact of the **Type 1 response** in terms of increased electricity generation or reduced demand, the **system operator** shall have the final determination

type 2 response means a **participant** response which the system operator has been made aware of that is supported by a **formal agreement(s)** resulting in increased electricity generation (due to reallocation of gas from industrial users) or reduced electricity demand.

watch status curve means the 1% **electricity risk curve**

- 2.2 References in this Policy to “energy”, “supply”, “demand”, “generation”, “capacity” and “shortage” are references to electrical energy, the supply of electricity, the demand for electricity, the generation of electricity, the capacity to generate electricity and the shortage of electricity.
- 2.3 *Revoked*
- 2.3A Each requirement in this Policy relating to **available hydro storage, electricity risk curves, electricity risk meter status** and ~~simulated storage trajectories~~~~hydro storage projections~~ applies separately to New Zealand and the South Island.
- 2.4 An obligation of the **system operator** under this Policy to make information publicly available may be satisfied by the **system operator** publishing the information on the **system operator** section of the **Transpower** website.
- 2.5 Any term in bold that is defined in the **Code** and used but not defined in this Policy has the same meaning as in the **Code**.

2A. Policy Intent

2A.1 The **system operator** develops and prepares the **electricity risk curves** and other security of supply information with the sole intent of informing stakeholders of the future risk of an **extended emergency**.

2A.2 The **electricity risk curves** are designed to model the power system's physical capability to conserve **available hydro storage** during an **extended emergency** at a South Island or national level. They assume the market design will create the incentive to do this.

2A.3 The **SOSA** is designed to provide information that will allow participants and stakeholders to form their own assessments of the future operational security. It is not attempting to forecast the future market.

3. Confidential information and forecasts

3.1 Nothing in this Policy requires the **system operator** to make available (publicly or otherwise) any information that is confidential to any person. However, the **system operator** may make confidential information available under this Policy in such a way that the subject of the confidential information cannot reasonably be ascertained.

3.2 In order to perform its obligations under this Policy the **system operator** is likely to be required to make projections about the future based on information that is historical, incomplete or not reasonably verifiable by the **system operator**. In making such projections the **system operator** is not obliged to do more than act as a reasonable and prudent **system operator** in accordance with clause 7.1A of the **Code**.

4. *Revoked*

5. Determining hydro storage

5.1 The **system operator** must determine **available hydro storage**, ~~and contingent hydro storage~~ and inflows using reasonably reliable information ~~about available hydro storage and contingent hydro storage~~ that is known to the **system operator**.

5.1A The **system operator** may include any other lake in its determination of **available hydro storage** ~~and~~ contingent hydro storage and inflows for the South Island or New Zealand, in addition to those lakes named in paragraphs (a) and (b) of the definition of **available hydro storage** and inflows, if material and reasonably reliable information about the controllable and available hydro storage from that lake becomes known to the **system operator**. The **system operator** must make publicly available any decision it makes to include a lake under this clause.

5.2 *Revoked*

5.3 The **system operator** must make publicly available the inputs and assumptions it has used to determine **available hydro storage** and **contingent hydro storage**.

6. Determining the electricity risk curves

6.0 The **system operator** must determine and make publicly available the **electricity risk curves** for the next calendar year on or before 30 April of the current calendar year.

6.1 The **electricity risk curves** must—

(a) assume full availability of installed transmission and generation **assets**, unless reasonably reliable information is known to the **system operator** that indicates otherwise; and

(aa) assume generation **assets** are not subject to constraints on the availability of thermal fuel, including delivery constraints, unless reasonably reliable information is known to the **system operator** that indicates otherwise. In making an assessment of reasonably reliable information the **system operator** will follow its **thermal fuel validation methodology**; and

(ab) use a medium demand forecast; and

(ac) only assume:

i **Type 1 response(s)** up to 620TJ per month of gas or 85GWh per month of electricity per response; and

ii **Type 2 response(s)** above 110TJ per month of gas or 15GWh per month of electricity per response; and

(b) assume short-term market behaviour that seeks to minimise use of hydro storage; and

(c) model the uncertainty of future inflows to hydro catchments using reasonably available historical records of those inflows; and

(d) show the 1%, 4% and 10% risks of future shortage; and

(da) show the level of storage at which an **official conservation campaign** would be commenced under clause 9.23 of the **Code**; and

(db) show the level of storage at which an **official conservation campaign** would be ended under clause 9.23A of the **Code**; and

(e) show any other risk of future shortage that triggers the availability of **contingent hydro storage**.

6.1A If an **electricity risk curve** is a **contingent storage release boundary** or an **electricity risk meter status curve** then the **electricity risk curve** must include a floor equal to:

(a) the amount of **contingent hydro storage** linked to the **electricity risk curve**; plus

(b) the amount of **contingent hydro storage** linked to **electricity risk curves** representing higher levels of risk of future shortage (if any); plus

(c) a buffer of 50 GWh unless the ~~system operator~~ **system operator** determines a different buffer and makes it publicly available.

6.1B The buffer referred to in clauses 9.23(1)(ab)(ii) and 9.23(2)(ab)(ii) of the **Code** is 50 GWh unless the **system operator** determines one or more different buffers and makes them publicly available.

6.1C A **contingent storage release boundary** that uses a risk of future shortage of 4% is termed the **'Alert' release boundary** and is the subsequent equivalent regulatory arrangement to the use of **'Alert'** status for the triggering of access to **'Alert' contingent hydro storage**.

6.1D A **contingent storage release boundary** that uses a risk of future shortage of 10% is termed the **'Emergency' release boundary**. The use of **'Emergency' contingent hydro storage** is dependent on an **official conservation campaign** being commenced.

6.2 The **system operator** must make publicly available the inputs and assumptions it has used to determine the **electricity risk curves**.

6.3 The **system operator** must review and, if necessary, update the inputs and assumptions it has used to determine the **electricity risk curves**—

(a) when—

(i) the **system operator** becomes aware of new reasonably reliable information that the **system operator** considers may yield a material change to the **electricity risk curves**; or

~~(ii) *revoked*~~

~~(iii) *revoked*~~

(iv) the **system operator** considers that a change to an electricity risk meter status ~~from **Alert** to **Emergency**~~ is imminent; and

(b) in any event, at least once per calendar month.

6.4 The **system operator** must change the **electricity risk curves** to reflect any update to the inputs and assumptions, if necessary. However, the **system operator** is not required to change the **electricity risk curves** for any months preceding the update to the inputs and assumptions.

6.5 Any change the **system operator** makes to the **electricity risk curves** applies from the date the change is made.

6.6 The **system operator** must ~~use reasonable endeavours to engage~~ ~~consult~~ with **participants who it believes have a material impact** on ~~the inputs and assumptions it uses in the determination of its determination of~~ the **electricity risk curves**, ~~and, where reasonably practical, on each update to the **electricity risk curves** before making them publicly available.~~

6.7 The **system operator** must make publicly available any change to the **contingent storage release information** as soon as reasonably practicable.

- 6.8 Thermal fuel available for electricity generation in the electricity risk curves will be calculated according to the **system operator's thermal fuel validation methodology**.
- 6.9 Each **participant** must make all **electricity risk curve disclosure information** in relation to the **participant** readily available to the **system operator** free of charge, as soon as reasonably practicable after the **participant** becomes aware of the information.
- 6.10 Despite clause 6.9, a **participant** is not required to make **electricity risk curve disclosure information** readily available to the **system operator** if—
- (a) doing so will be a breach of law; or
 - (b) the **electricity risk curve disclosure information** concerns an incomplete proposal or negotiation; or
 - (c) the **electricity risk curve disclosure information** comprises matters of supposition or is insufficiently definite to warrant being made readily available to the **system operator**; or
 - (d) the **participant** claims legal professional privilege or privilege against self-incrimination in respect of the **electricity risk curve disclosure information**.
- 6.11 A **participant** that relies on clause 6.10 must, as soon as reasonably practicable, make the **electricity risk curve disclosure information** readily available to the **system operator**, free of charge, if clause 6.10 ceases to apply to the **electricity risk curve disclosure information**.
- 6.12 A **participant** that does not make information readily available to the **system operator** under clause 6.10 must, if required to do so by the **system operator**, —
- (a) satisfy the **system operator** that clause 6.10 applies to the **electricity risk curve disclosure information**, if the **participant** relies on clause 6.10; or
 - (b) satisfy the **system operator** that the information is not **electricity risk curve disclosure information**.
- 6.13 A **participant** must not enter into a confidentiality agreement with another person for the purpose of avoiding making **electricity risk curve disclosure information** readily available to the **system operator** under clause 6.9.
- 6.14 The **system operator** must keep all information received by it under clause 6.9 confidential and must not disclose it to any other person except—
- (a) with the written consent of the person who provided the information; or
 - (b) if the information is required to be disclosed to or by the **Rulings Panel** or the **Authority** under this **Code** or any law.

7. Revoked

7A. Determining the electricity risk meter status

- 7A.1 ~~The system operator must develop and make publicly available a methodology for forecasting the time to an official conservation campaign based on the rate of decline in available hydro storage.~~ *Revoked*
- 7A.2 The **system operator** must determine the electricity risk meter status using the electricity risk meter status curves as follows for both the South Island and New Zealand—
- (a) ~~Normal: the rate of decline methodology indicates an official conservation campaign would not be commenced under clause 9.23 of the Code within 8 weeks available hydro storage is greater than the watch status curve 21% curve and the electricity risk meter status is not 'Watch', 'Alert' or 'Emergency'~~
 - (b) ~~Watch: the rate of decline methodology indicates an official conservation campaign would be commenced under clause 9.23 of the Code within 8 weeks and not within 3 weeks available hydro storage is less than or equal to the watch status curve 21% electricity risk curve, and the electricity risk meter status is not 'Alert' or 'Emergency';~~
 - (c) ~~Alert: the rate of decline methodology indicates an official conservation campaign would be commenced under clause 9.23 of the Code within 3 weeks available hydro storage is less than or equal to the alert status curve 4% electricity risk curve and the electricity risk meter status is not 'Emergency';~~
 - (d) Emergency: the **system operator** has commenced an **official conservation campaign** under clause 9.23 of the **Code** and has not ended it under clause 9.23_A of the Code.
- 7A.3 If the electricity risk meter status for New Zealand is the same as for the South Island, a single energy risk meter status for New Zealand and the South Island ~~only~~ is required.
- 7A.4 The **system operator** must make publicly available any change to the electricity risk meter status.

8. *Revoked*

9. *Revoked*

10. Annual Security of Supply Assessment

- 10.1 The **system operator** must prepare and make publicly available at least annually a security of supply assessment that contains detailed supply and demand modelling that—
- (a) forecasts at least 5 years; and

- (b) enables interested parties to assess whether the energy security of supply standard and the capacity security of supply standard set out in clause 7.3(2) of the **Code** are likely to be met over that period.
- 10.2 The ~~system operator~~**system operator** must make publicly available the Annual Security of Supply Assessment by 30 June each calendar year.
- 10.3 The **system operator** must consult with persons that the **system operator** thinks are representative of the interests of persons likely to be substantially affected by the **SOSA** before making it publicly available.
- 10.4 In addition to the information referred to in clauses 7.3(1)(a)(i) and 7.3(2C) of the **Code**, but subject to clause 7.3(2D) of the **Code**, the **SOSA** must include—
- (a) capacity and energy margin assessments including projections of the North Island **winter capacity margin**, the New Zealand **winter energy margin**, and the South Island **winter energy margin**; and
 - (b) sufficient details of the inputs, assumptions, and methodologies that the **system operator** has used to prepare that information as to allow interested parties to recreate that information; and
 - (c) without limiting subclause (b) of this clause, information, including the **system operator's** assumptions, about—
 - (i) existing generation and transmission capabilities; and
 - (ii) expected generation and transmission outages; and
 - (iii) generation and transmission assets to be removed from service; and
 - (iv) the availability of primary fuels and in particular thermal fuel constraints; and
 - (v) significant new generation and transmission assets to be commissioned; and
 - (vi) **demand** and **demand** reduction that occurs in response to periods of high **wholesale market** spot prices, excluding any **demand** reduction from energy savings campaigns or the forced rationing of **demand**; and
 - (vii) any other factors (such as electricity market dynamics) that the **system operator** expects to materially affect security of supply; and
 - (d) information on how the **system operator** will monitor energy and capacity margins.

11. Weekly security of supply report

- 11.1 The **system operator** must prepare and make publicly available a weekly security of supply report.

11.2 The weekly security of supply report must include—

- (a) a comparison of **available hydro storage** with the **electricity risk curves**; and
- (b) *revoked*
- (c) the electricity risk meter status; and
- (d) the **contingent storage release information**.

11.3 The weekly security of supply report must also include the following information relating to the previous 4 weeks, in an aggregated form—

- (a) hydro storage and catchment inflows; and
- (b) generation at key thermal **generating stations**; and
- (c) **demand**; and
- (d) inter-island transfers; and
- (e) other information that the system operator thinks will assist interested parties' understanding of the current security of supply situation.

11.4 *Revoked*

12. **Simulated storage trajectories**~~Hydro storage projection~~

12.0 The **system operator** must prepare and make publicly available ~~a hydro storage projections~~simulated storage trajectories ~~each calendar month for each calendar year by 31 January of that calendar year.~~

12.0A ~~The system operator must review and, if necessary, update the hydro storage projection by 30 April of the calendar year to which it relates.~~ *Revoked*

12.1 The ~~hydro storage projections~~simulated storage trajectories must project **available hydro storage** for the calendar year using the following inputs—

- (a) current **available hydro storage**; and
- (b) the historical range of inflows for hydro catchments; and
- (c) expected availability and use of transmission and generation **assets**; and
- (d) expected **demand**; and
- (e) the **electricity risk curves**; and
- (f) any other reasonably reliable information known to the **system operator** that the **system operator** considers to be relevant to the ~~hydro storage projections~~simulated storage trajectories.

12.2 *Revoked*

12.3 ~~While the electricity risk meter status is Watch or Alert, the **system operator** must review and, if necessary, update the hydro storage projection at least once per calendar month.~~ revoked

12.4 While the electricity risk meter status is Emergency, the **system operator** must review and, if necessary, update the ~~hydro storage projection~~simulated storage trajectories at least once per calendar week.

12.5 *Revoked*

12.6 *Revoked*

13. Thermal Fuel Supply Disruptions

13.1 *Revoked*

13.2 The **system operator** must develop and make publicly available scenarios for potential thermal fuel supply disruptions.

13.3 These scenarios must consider the power system's ability during thermal fuel supply disruptions to meet the following—

- (a) peak **demand**; and
- (b) ongoing energy consumption.

13.4 The **system operator** must review and, if necessary, update these scenarios ~~from time to time~~ quarterly to ensure they remain current.

Appendix C Authority's proposed amendments to the SOSFIP

Note: for ease of reading, the Authority has accepted all changes proposed by the system operator, and the Authority's changes have been inserted in track change format.

Security of Supply Forecasting and Information Policy

Effective Date: To be confirmed

1. Background

- 1.1 This Policy sets out the **system operator's** policy on information and forecasting for New Zealand and South Island security of supply. Security of supply in the context of this Policy is the New Zealand power system's present and future ability to meet electricity demand at a national and South Island level.
- 1.2 The **system operator's** principal objective under this Policy is to ensure, to the extent possible, the provision of high-quality security of supply related information to all interested parties.
- 1.3 Part 7 of the **Code** sets out the **system operator's** obligation to prepare and publish the **security of supply forecasting and information policy** and the **emergency management policy**. Part 9 of the **Code** sets out the system operator's obligation to prepare and publish the **system operator rolling outage plan** and the system operator may request specified participants to develop a participant rolling outage plan. Part 9 also sets out the circumstances when the system operator must commence an **official conservation campaign**. Together, these policies and obligations relate to managing an **extended emergency** in which the ability of the power system to meet demand over an extended period of time is at risk.

2. Glossary

- 2.1 In this Policy, unless the context otherwise requires—

alert status curve means the 4% **electricity risk curve**

Authority means the Electricity Authority

available hydro storage means hydro storage, including **contingent hydro storage** whether currently available or not, that, in the **system operator's** reasonable opinion, is controllable and available for generation of electricity from—

- (a) Lakes Tekapo, Pukaki, Te Anau, Hawea and Manapouri for the South Island; and
- (b) Lakes Taupo, Tekapo, Pukaki, Te Anau, Hawea and Manapouri for New Zealand; and
- (c) any other lakes the **system operator** decides to include under clause 5.1A of this Policy

Code means the Electricity Industry Participation Code 2010

contingent hydro storage means the additional hydro storage that becomes available for generation at a **contingent storage release boundary**

contingent storage release boundary means an **electricity risk curve** representing a level of risk of future shortage at which a resource consent grants the consent holder access to additional hydro storage

contingent storage release information means information about the **contingent hydro storage** currently available for generation

electricity risk curve means the New Zealand or South Island hydro storage level over a calendar year that represents a specific, quantified level of risk of future shortage determined by factoring in all **available hydro storage**, which may include a floor under clause 6.1A

electricity risk curve disclosure information, in relation to a participant, means information

that –

- (a) is about the **participant**; and
- (b) is held by the **participant**; and
- (c) the **participant** expects, or ought reasonably to expect, will, or is likely to have a material impact on the **electricity risk curve** inputs and assumptions made publicly available by the **system operator**

electricity risk meter status curves means the **watch status curve** and the **alert status curve**

extended emergency has the meaning given to it in the **emergency management policy**

formal agreement means a binding agreement that enables a response such as:

- (a) increased electricity generation due to a reallocation of gas; or
- (b) electricity demand to be reduced.

The following information related to the response should be included in the agreement:

- (a) maximum quantity of increased electricity generation and/or electricity demand reduction (TJ per day or MWh per day);
- (b) duration of the response (days);
- (c) under what conditions the response could be activated, including any options for parties to activate the response; and

(d) how the response is linked to an **official conservation campaign**.

Where there is any doubt as to whether an agreement is a **formal agreement** for the purposes of this policy, the **system operator** shall have the final determination

inflows mean the hydrological inflows into—

- (a) Lakes Tekapo, Pukaki, Te Anau, Hawea and Manapouri for the South Island; and
- (b) Lakes Taupo, Tekapo, Pukaki, Te Anau, Hawea and Manapouri for New Zealand; and
- (c) any other lakes the system operator decides to include under clause 5.1A of this Policy

SOSA means the Annual Security of Supply Assessment referred to in clause 7.3(1)(a)(i) of the **Code**

thermal fuel validation methodology means the process followed by the **system operator** to evaluate restrictions on thermal fuel availability, as it relates to ~~the~~ the **electricity risk curve** inputs and assumptions made publicly available by the **system operator**

type 1 response means a **participant** market response, resulting in increased electricity generation (due to reallocation of gas from industrial users)—~~or reduced electricity demand~~ that can occur within 4 weeks which:

- (a) the system operator has been made aware of; or
- (b) has been identified through historical observation(s),

and in each case the **system operator** reasonably believes is still applicable.

Where there is any doubt as to whether a response is a **Type 1 response** or the impact of the **Type 1 response** in terms of increased electricity generation or reduced demand, the **system operator** shall have the final determination

type 2 response means a **participant** response which the system operator has been made aware of that is supported by a **formal agreement(s)** resulting in increased electricity generation (due to reallocation of gas from industrial users)—~~or reduced electricity demand~~.

watch status curve means the 1% **electricity risk curve**

2.2 References in this Policy to “energy”, “supply”, “demand”, “generation”, “capacity” and “shortage” are references to electrical energy, the supply of electricity, the demand for electricity, the generation of electricity, the capacity to generate electricity and the shortage of electricity.

2.3 *Revoked*

2.3A Each requirement in this Policy relating to **available hydro storage, electricity risk curves**, electricity risk meter status and simulated storage trajectories applies separately to New Zealand and the South Island.

2.4 An obligation of the **system operator** under this Policy to make information publicly available may be satisfied by the **system operator** publishing the information on the **system operator** section of the **Transpower** website.

2.5 Any term in bold that is defined in the **Code** and used but not defined in this Policy has the same meaning as in the **Code**.

2A. Policy Intent

2A.1 The **system operator** develops and prepares the **electricity risk curves** and other security of supply information with the sole intent of informing stakeholders of the future risk of an **extended emergency**.

2A.2 The **electricity risk curves** are designed to model the power system's physical capability to conserve **available hydro storage** during an **extended emergency** at a South Island or national level. They assume the market design will create the incentive to do this.

2A.3 The **SOSA** is designed to provide information that will allow participants and stakeholders to form their own assessments of the future operational security. It is not attempting to forecast the future market.

3. Confidential information and forecasts

3.1 Nothing in this Policy requires the **system operator** to make available (publicly or otherwise) any information that is confidential to any person except as provided for in 3.3 below. However, the **system operator** may make confidential information available under this Policy in such a way that the subject of the confidential information cannot reasonably be ascertained.

3.2 In order to perform its obligations under this Policy the **system operator** is likely to be required to make projections about the future based on information that is historical, incomplete or not reasonably verifiable by the **system operator**. In making such projections the **system operator** is not obliged to do more than act as a reasonable and prudent **system operator** in accordance with clause 7.1A of the **Code**.

3.3 At the **Authority's** request, the system operator will provide all information it uses to perform its obligations under this policy, including confidential information, to the

Authority. The Authority will only use confidential information for the purposes of monitoring the system operator and assuring itself and stakeholders that the system operator's outputs are accurate. Nothing in this clause requires the Authority to make available (publicly or otherwise) any information that is confidential. However, the Authority may make confidential information available under this policy in such a way that the subject of the confidential information cannot reasonably be ascertained

4. *Revoked*

5. Determining hydro storage

5.1 The **system operator** must determine **available hydro storage, contingent hydro storage and inflows** using reasonably reliable information that is known to the **system operator**.

5.1A The **system operator** may include any other lake in its determination of **available hydro storage, contingent hydro storage and inflows** for the South Island or New Zealand, in addition to those lakes named in paragraphs (a) and (b) of the definition of **available hydro storage and inflows**, if material and reasonably reliable information about the controllable and available hydro storage from that lake becomes known to the **system operator**. The **system operator** must make publicly available any decision it makes to include a lake under this clause.

5.2 *Revoked*

5.3 The **system operator** must make publicly available the inputs and assumptions it has used to determine **available hydro storage and contingent hydro storage**.

6. Determining the electricity risk curves

6.0 The **system operator** must determine and make publicly available the **electricity risk curves** for the next calendar year on or before 30 April of the current calendar year.

6.1 The **electricity risk curves** must—

(a) assume full availability of installed transmission and generation **assets**, unless reasonably reliable information is known to the **system operator** that indicates otherwise; and

(aa) assume generation **assets** are not subject to constraints on the availability of thermal fuel, including delivery constraints, unless reasonably reliable information is known to the **system operator** that indicates otherwise. In making an

assessment of reasonably reliable information the **system operator** will follow its **thermal fuel validation methodology**; and

- (ab) use a medium demand forecast; and
- (ac) in relation to reallocation of gas fuel from industrial users for electricity generation, only assume:
 - i **Type 1 response(s)** up to 620TJ per month of gas or 85GWh per month of electricity per response; and
 - ii **Type 2 response(s)** above 110TJ per month of gas or 15GWh per month of electricity per response; and

(ad) in relation to electricity demand response, including the impact of distributed energy resources, use the **system operator's** experience and judgement to assess the amount of demand response. This assessment may include formal demand response contracts, historical observation, and information the **system operator** is aware of, but also includes modelling, forecast future demand response and any other demand response likely in the system operator's judgement; and

- (b) assume short-term market behaviour that seeks to minimise use of hydro storage; and
- (c) model the uncertainty of future inflows to hydro catchments using reasonably available historical records of those inflows; and
- (d) show the 1%, 4% and 10% risks of future shortage; and
- (da) show the level of storage at which an **official conservation campaign** would be commenced under clause 9.23 of the **Code**; and
- (db) show the level of storage at which an **official conservation campaign** would be ended under clause 9.23A of the **Code**; and
- (e) show any other risk of future shortage that triggers the availability of **contingent hydro storage**.

6.1A If an **electricity risk curve** is a **contingent storage release boundary** or an **electricity risk meter status curve** then the **electricity risk curve** must include a floor equal to:

- (a) the amount of **contingent hydro storage** linked to the **electricity risk curve**; plus
- (b) the amount of **contingent hydro storage** linked to **electricity risk curves** representing higher levels of risk of future shortage (if any); plus

- (c) a buffer of 50 GWh unless the **system operator** determines a different buffer and makes it publicly available.
- 6.1B The buffer referred to in clauses 9.23(1)(ab)(ii) and 9.23(2)(ab)(ii) of the **Code** is 50 GWh unless the **system operator** determines one or more different buffers and makes them publicly available.
- 6.1C A **contingent storage release boundary** that uses a risk of future shortage of 4% is termed the 'Alert' release boundary and is the subsequent equivalent regulatory arrangement to the use of 'Alert' status for the triggering of access to 'Alert' **contingent hydro storage**.
- 6.1D A **contingent storage release boundary** that uses a risk of future shortage of 10% is termed the 'Emergency' release boundary. The use of 'Emergency' **contingent hydro storage** is dependent on an **official conservation campaign** being commenced.
- 6.2 The **system operator** must make publicly available the inputs and assumptions it has used to determine the **electricity risk curves**.
- 6.3 The **system operator** must review and, if necessary, update the inputs and assumptions it has used to determine the **electricity risk curves**—
- (a) when—
- (i) the **system operator** becomes aware of new reasonably reliable information that the **system operator** considers may yield a material change to the **electricity risk curves**; or
- (ii) *revoked*
- (iii) *revoked*
- (iv) the **system operator** considers that a change to an electricity risk meter status is imminent; and
- (b) in any event, at least once per calendar month.
- 6.4 The **system operator** must change the **electricity risk curves** to reflect any update to the inputs and assumptions, if necessary. However, the **system operator** is not required to change the **electricity risk curves** for any months preceding the update to the inputs and assumptions.
- 6.5 Any change the **system operator** makes to the **electricity risk curves** applies from the date the change is made.

- 6.6 The **system operator** must use reasonable endeavours to engage with **participants** who it believes have a material impact on the inputs and assumptions it uses in the determination of the **electricity risk curves**.
- 6.7 The **system operator** must make publicly available any change to the **contingent storage release information** as soon as reasonably practicable.
- 6.8 Thermal fuel available for electricity generation in the electricity risk curves will be calculated according to the **system operator's thermal fuel validation methodology**.
- 6.9 Each **participant** must make all **electricity risk curve disclosure information** in relation to the **participant** readily available to the **system operator** free of charge, as soon as reasonably practicable after the **participant** becomes aware of the information.
- 6.10 Despite clause 6.9, a **participant** is not required to make **electricity risk curve disclosure information** readily available to the **system operator** if—
- (a) doing so will be a breach of law; or
 - (b) the **electricity risk curve disclosure information** concerns an incomplete proposal or negotiation; or
 - (c) the **electricity risk curve disclosure information** comprises matters of supposition or is insufficiently definite to warrant being made readily available to the **system operator**; or
 - (d) the **participant** claims legal professional privilege or privilege against self-incrimination in respect of the **electricity risk curve disclosure information**.
- 6.11 A **participant** that relies on clause 6.10 must, as soon as reasonably practicable, make the **electricity risk curve disclosure information** readily available to the **system operator**, free of charge, if clause 6.10 ceases to apply to the **electricity risk curve disclosure information**.
- 6.12 A **participant** that does not make information readily available to the **system operator** under clause 6.10 must, if required to do so by the **system operator**, —
- (a) satisfy the **system operator** that clause 6.10 applies to the **electricity risk curve disclosure information**, if the **participant** relies on clause 6.10; or
 - (b) satisfy the **system operator** that the information is not **electricity risk curve disclosure information**.

- 6.13 A **participant** must not enter into a confidentiality agreement with another person for the purpose of avoiding making **electricity risk curve disclosure information** readily available to the **system operator** under clause 6.9.
- 6.14 The **system operator** must keep all information received by it under clause 6.9 confidential and must not disclose it to any other person except—
- (a) with the written consent of the person who provided the information; or
 - (b) if the information is required to be disclosed to or by the **Rulings Panel** or the **Authority** under this **Code** or any law; or
 - (c) to the **Authority** as provided for in clause 3.3.

7. **Revoked**

7A. Determining the electricity risk meter status

7A.1 *Revoked*

7A.2 The **system operator** must determine the electricity risk meter status using the **electricity risk meter status curves** as follows for both the South Island and New Zealand—

- (a) Normal: **available hydro storage** is greater than the **watch status curve** and the electricity risk meter status is not 'Watch', 'Alert' or 'Emergency'
- (b) Watch: **available hydro storage** is less than or equal to the **watch status curve**, and the electricity risk meter status is not 'Alert' or 'Emergency';
- (c) Alert: **available hydro storage** is less than or equal to the **alert status curve** and the electricity risk meter status is not 'Emergency';
- (d) Emergency: the **system operator** has commenced an **official conservation campaign** under clause 9.23 of the **Code** and has not ended it under clause 9.23 A of the **Code**.

7A.3 If the electricity risk meter status for New Zealand is the same as for the South Island, a single energy risk meter status for New Zealand and the South Island is required.

7A.4 The **system operator** must make publicly available any change to the electricity risk meter status.

8. **Revoked**

9. **Revoked**

10. Annual Security of Supply Assessment

10.1 The **system operator** must prepare and make publicly available at least annually a security of supply assessment that contains detailed supply and demand modelling that—

- (a) forecasts at least 5 years; and
- (b) enables interested parties to assess whether the energy security of supply standard and the capacity security of supply standard set out in clause 7.3(2) of the **Code** are likely to be met over that period.

10.2 The **system operator** must make publicly available the Annual Security of Supply Assessment by 30 June each calendar year.

10.3 The **system operator** must consult with persons that the **system operator** thinks are representative of the interests of persons likely to be substantially affected by the **SOSA** before making it publicly available.

10.4 In addition to the information referred to in clauses 7.3(1)(a)(i) and 7.3(2C) of the **Code**, but subject to clause 7.3(2D) of the **Code**, the **SOSA** must include—

- (a) capacity and energy margin assessments including projections of the North Island **winter capacity margin**, the New Zealand **winter energy margin**, and the South Island **winter energy margin**; and
- (b) sufficient details of the inputs, assumptions, and methodologies that the **system operator** has used to prepare that information as to allow interested parties to recreate that information; and
- (c) without limiting subclause (b) of this clause, information, including the **system operator's** assumptions, about—
 - (i) existing generation and transmission capabilities; and
 - (ii) expected generation and transmission outages; and
 - (iii) generation and transmission assets to be removed from service; and
 - (iv) the availability of primary fuels and in particular thermal fuel constraints; and
 - (v) significant new generation and transmission assets to be commissioned; and
 - (vi) **demand** and **demand** reduction that occurs in response to periods of high **wholesale market** spot prices, excluding any **demand**

reduction from energy savings campaigns or the forced rationing of **demand**; and

- (vii) any other factors (such as electricity market dynamics) that the **system operator** expects to materially affect security of supply; and
- (d) information on how the **system operator** will monitor energy and capacity margins.

11. Weekly security of supply report

11.1 The **system operator** must prepare and make publicly available a weekly security of supply report.

11.2 The weekly security of supply report must include—

- (a) a comparison of **available hydro storage** with the **electricity risk curves**; and
- (b) *revoked*
- (c) the electricity risk meter status; and
- (d) the **contingent storage release information**.

11.3 The weekly security of supply report must also include the following information relating to the previous 4 weeks, in an aggregated form—

- (a) hydro storage and catchment inflows; and
- (b) generation at key thermal **generating stations**; and
- (c) **demand**; and
- (d) inter-island transfers; and
- (e) other information that the **system operator** thinks will assist interested parties' understanding of the current security of supply situation.

11.4 *Revoked*

12. Simulated storage trajectories

12.0 The **system operator** must prepare and make publicly available simulated storage trajectories each calendar month.

12.0A *Revoked*

12.1 The simulated storage trajectories must project **available hydro storage** for the calendar year using the following inputs—

- (a) current **available hydro storage**; and

- (b) the historical range of inflows for hydro catchments; and
- (c) expected availability and use of transmission and generation **assets**; and
- (d) expected **demand**; and
- (e) the **electricity risk curves**; and
- (f) any other reasonably reliable information known to the **system operator** that the **system operator** considers to be relevant to the simulated storage trajectories.

12.2 *Revoked*

12.3 *revoked*

12.4 While the electricity risk meter status is Emergency, the **system operator** must review and, if necessary, update the simulated storage trajectories at least once per calendar week.

12.5 *Revoked*

12.6 *Revoked*

13. Thermal Fuel Supply Disruptions

13.1 *Revoked*

13.2 The **system operator** must develop and make publicly available scenarios for potential thermal fuel supply disruptions.

13.3 These scenarios must consider the power system's ability during thermal fuel supply disruptions to meet the following—

- (a) peak **demand**; and
- (b) ongoing energy consumption.

13.4 The **system operator** must review and, if necessary, update these scenarios quarterly to ensure they remain current.

Glossary of abbreviations and terms

Authority	Electricity Authority
Act	Electricity Industry Act 2010
Code	Electricity Industry Participation Code 2010
CE	Contingent event
ECE	Extended contingent event